CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 86 - 9
WASTE DISCHARGE REQUIREMENTS FOR:

TELEDYNE SEMICONDUCTOR
MOUNTAIN VIEW
SANTA CLARA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region, (hereinafter called the Board) finds that:

1. Teledyne Semiconductor (hereinafter called the discharger) occupies approximately eight acres of land in the City of Mountain View, Santa Clara County located at 1300 Terra Bella Avenue. The property is approximately 1000 feet southwest of the intersection of Stierlin Road and Interstate 101 and approximately 2.8 miles south of the southern tip of San Francisco Bay (Attachment 1).

2. The discharger has manufactured semiconductors at this facility since 1962. Hazardous materials used onsite currently or in the past include trichloroethene (TCE), 1,1,1 - trichloroethane (TCA) and other organic solvents. From 1962 to 1980, four underground storage units held various solvents: three of these were concrete sumps used for acid neutralization and waste TCE collection and the fourth unit was a 2,000 gallon steel tank used to store a mixture of isopropyl alcohol, xylene and acetone. In late 1979, a two inch by four inch hole was discovered in one of the acid neutralization/waste TCE collection sumps where hydrofluoric acid had corroded the concrete at a metal drain connection. In 1980, all underground solvent handling/storage activities were discontinued, and all solvents are currently stored above ground. The discharger has not used TCE in its operations since 1980.

3. Subsurface investigations were initiated by the discharger in August 1982 in response to the Board's Underground Leak Detection Program Questionnaire. The results of these investigations indicate that the discharger released an unknown amount of TCE due to leakage from underground storage units. This release is a major source of groundwater pollution by organic solvents in this area.

4. A soil sample taken above the water table immediately after the excavation of the tank in August 1982 contained 663 ppb xylene, 259 ppb TCE, 158 ppb ethylbenzene and 88 ppb dichloroethene (DCE). These concentrations of organic solvents in the soil are not high enough for the Department of Health Services to require soil removal solely on the basis of the potential hazard of direct contact.

5. The groundwater flow system in the vicinity of and downgradient from the discharger's facility includes an upper and lower aquifer. The upper aquifer is comprised of two zones: a shallow zone (10-30 feet below ground surface) and an intermediate zone (45-75 feet below ground surface) separated by approximately 15 feet of clay. The lower aquifer is found at depths generally greater than 150 feet and is believed to be separated from the upper aquifer by approximately 80 feet of mostly fine-grained materials.

6. Onsite wells perforated in the shallow zone of the upper aquifer contain concentrations of TCE up to 3800 ppb, DCE up to 7400 ppb as well as lesser concentrations of a number of other solvents including TCA, tetrachloroethene (PCE), and dichloroethane (DCA). Onsite wells perforated in the intermediate zone of the upper aquifer contain concentrations of TCE up to 9800 ppb and DCE up to 31 ppb.

7. In 1982, Santa Clara Valley Water District data documented approximately 120 active private domestic wells within a one mile radius of the plant site. Many of these wells were perforated in the upper aquifer. The discharger in conjunction with the Santa Clara County Health Department tested 47 active private wells in the area north of the Bayshore Freeway, between Permanente Creek to the west and Stierlin Road to the east (North Bayshore area). Sampling results confirmed the presence of TCE and DCE in the shallow groundwater. The discharger advanced the costs to connect residents in this area to the municipal water system and supplied bottled water until the connections could be made. As of September 1984, all 47 residences, except two because of access problems, had been hydraulically connected to the municipal water system by the discharger. The remaining two residences were connected by February 1985.

8. A total of 23 monitoring wells have been installed by the discharger as of December 1985 to characterize the nature and extent of groundwater pollution. However, the pollution plume has not been completely defined and cleanup or containment has not yet begun. Teledyne has installed an extraction well onsite and is in the process of implementing interim onsite cleanup and containment. The results so far indicate that solvent pollution has extended vertically to a depth of about 75 feet (intermediate zone of the upper aquifer) and as far north as the City of Mountain View landfill dewatering trench located about one mile downgradient of the facility. According to a proposed groundwater investigation plan approved by the Executive Officer, the discharger is in the process of installing eleven additional monitoring wells to further define the lateral extent of pollution downgradient from the site. The discharger has evaluated the feasibility of using existing deep wells (>150 feet) to monitor the possible presence of pollutants in the lower aquifer.

9. Water pumped from the Mountain View landfill dewatering trench is discharged to Permanente Creek which flows north to the southern tip of San Francisco Bay. A concentration of TCE of 320 ppb and of DCE of 120 ppb were found in a seep located on the south side of the dewatering trench (downgradient from the discharger) in August 1985. Based on this and other sampling data, concentrations of organic solvents in the discharge from the dewatering system may be exceeding limits established in the Board's guidelines.

10. Two City of Mountain View municipal wells are located about 5000 feet upgradient (southwest) from the dischargers site. Water from these wells is obtained from the lower aquifer at depths below 232 feet. A major concern is the protection of this lower aquifer from the possible spread of organic solvents from the upper aquifer.

11. Onsite and offsite interim containment and cleanup measures need to be implemented to alleviate the substantial threat to the environment posed by the continued migration of the groundwater plume of organic solvents and to provide a substantive technical basis for designing and evaluating the effectiveness of final cleanup alternatives.

12. The previous release of organic solvents to waters of the State, the continued movement of organic solvents from soils and from fine - grained sediments within the saturated zone to groundwater aquifers, and the potential for continued migration of these compounds to uncontaminated waters constitutes a discharge for purposes of Water Code Section 13263(a).

13. At the request of the Regional Board staff, the discharger submitted a report of Waste Discharge to the Board on August 15, 1985.

14. The Regional Board adopted a revised Water Quality Control Plan for the San Francisco Bay Region (Basin Plan) on July 21, 1982. The Basin Plan contains water quality objectives for South San Francisco Bay and contiguous surface and groundwaters.

15. The existing and potential beneficial uses common to both South San Francisco Bay and Permanente Creek include:

    water contact recreation
    non-contact recreation
    wildlife habitat
    fish spawning

16. The additional existing and potential beneficial uses of South San Francisco Bay include:

    industrial service supply

navigation
ocean, commercial and sport fishing
preservation of rare and endangered species
fish migration
shellfish harvesting
estuarine habitat

17. The existing and potential beneficial uses of the groundwaters from the upper and lower aquifer systems are:

    municipal and domestic supply
    industrial service and process supply
    agricultural water supply

18. The Carpenter - Presley - Tanner Hazardous Substances Act (Section 25356.1 of the California Health and Safety Code) requires the Department of Health Services or, if appropriate, the Board to prepare or approve remedial action plans for all sites, such as Teledyne Semiconductor, which are listed pursuant to Section 25356 (the state superfund list). Before a final remedial action plan can be developed, further site characterizaton is needed and interim cleanup measures onsite and offsite need to be implemented and their effectiveness determined.

19. The Board has notified the discharger and all interested agencies and persons of its intent to issue waste discharge requirements for the discharge and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

20. The Board, at a public meeting, heard and considered all comments pertaining to the discharge.

21. This project constitutes a minor modification to land and such activity is thereby exempt from the provisions of the California Environmental Quality Act under section 15304, Title 14, of the California Administrative Code.

IT IS HEREBY ORDERED, that the discharger, in order to meet the provisions contained in Division 7 of the California Code and regulations adopted thereunder, shall comply with the following:

A. PROHIBITIONS

1. The discharge of wastes or hazardous materials in a manner which will degrade water quality or adversely affect beneficial uses of waters of the State is prohibited.

2. Further significant migration of pollutants through subsurface transport to waters of the State is prohibited.

3. Activities associated with the subsurface investigation and cleanup which will cause significant adverse migration of pollutants or adversely spread any pollutants from other sites

is prohibited.

B. SPECIFICATIONS

1. The storage, handling, treatment, or disposal of polluted soil or groundwater shall not create a nuisance as defined in Section 13050(m) of the California Water Code.

2. The historical and existing local and regional hydrogeologic conditions shall be defined in the areas of and contiguous to the pollution emanating from the discharger's site.

3. The lateral and vertical extent of soil and groundwater pollution shall be defined.

4. The potential for private wells in the area of the pollution to act as conduits for the spread of the pollution shall be identified. The threat posed by wells identified as actual or potential conduits shall be eliminated to the extent legally possible.

C. PROVISIONS

1. In order to comply with Specifications B.2. and B.3., the discharger shall complete the following tasks according to the following time schedule.

TASKS	COMPLETION DATE
a. Submit a technical report acceptable to the Executive Officer evaluating the results of sampling the five shallow and six intermediate wells installed in order to define the lateral extent of organic solvents in the upper aquifer.	March 13, 1986
b. If the lateral extent of organic solvent migration in the upper aquifer can not be adequately defined from the results of Provision 1.a., submit a proposal for completing this task.	Within sixty days after the submittal of the report for Provision 1.a., but no later than June 10, 1986.
c. Complete work described in the approved proposal for Provsion 1.b. and submit a final report discussing the results of implementing the plan for defining the lateral extent of organic solvent migration in the upper aquifer.	Within twenty weeks after receiving the Executive Officer's approval of the proposal provided under Provision 1.b

d.	Implement a deep aquifer monitoring program in the area located laterally between the upper aquifer groundwater plume of organic solvents and the City of Mountain View wells 10 and 17. The monitoring location will be no more than 1000 feet from the former, preferably in the vicinity of Terra Bella Ave. and West Middlefield Road. Vertically the monitoring will include at least the first four principal groupings of aquifers in use with no more than two principal groupings composited within any monitoring sample.	July 2, 1986
e.	Submit a plan and time schedule for complying with 1.d.	March 10, 1986
f.	If organic solvents are found in the lower aquifer system, submit a proposal including a time schedule, for assessing the extent of the plume. The assessment shall include a summary of the historical and existing, hydrogeologic characteristics of the upper and lower aquifers, including groundwater gradient contour maps, pollution concentration maps and cross-section geologic maps (cross-sections shall include any interpretative lines connecting similiar units in adjacent wells).	Within sixty days of verifying organic solvents are present in the lower aquifer system.
g.	Sample well No. 6S2W09R8 for the identified chemical constituents using a packer test.	May 1, 1986
h.	Submit a report on the analytical results of the sampling performed in Provision 1.g. above.	June 16, 1986

3. In order to comply with Specification B.4., the discharger shall meet the following compliance time schedule:

	TASKS	COMPLETION DATE
a.	Investigate whether private deep wells (>150 feet) other than those identified by Santa Clara Valley Water District's (SCVWD) Abandoned Well Program exist in the vicinity of the site which have the potential to act as conduits for inter-aquifer cross-pollution.	April 15, 1986
b.	In conjunction with SCVWD's Abandoned Well program, develop a program to respond to potential conduits and submit a technical report reasonably identifying potential conduits	June 16, 1986

with options for addressing closure.

4. In order to comply with Prohibitions A.1, A.2, and A.3, the discharger shall complete the following tasks according to the following time schedule:

	TASKS	COMPLETION DATE
a.	Submit a proposal in coordination with the City of Mountain View and Spectra Physics to evaluate 1) the impact on beneficial uses of the the current discharge of the organic solvent plume to surface waters via the Mountain View landfill dewatering trench 2) the effect of interim cleanup alternatives on the discharge of the pollutant plume and 3) the impact of planned future dewatering systems at or adjacent to the Mountain View landfill on the discharge of the organic solvent plume.	July 15, 1986
b.	Complete work described in the approved proposal and submit a technical report acceptable to the Executive Officer which discusses methods, results and conclusions of the investigation.	November 15, 1986
c.	Submit a proposal, including a time schedule, for installing a groundwater treatment and discharge system for operating Well RA-1 on the discharger's property as a groundwater extraction well in the upper aquifer.	March 10, 1986
d.	Submit the permit applications necessary for implementing the groundwater treatment and discharge system provided under Provision 4.a.	March 10, 1986
e.	Begin operating Well RA-1 as a groundwater extraction well in upper aquifer.	Within eight weeks after receipt of all necessary permits.
f.	Monitor the effectiveness of Well RA-1 in capturing the distribution of solvents in the upper aquifer through monthly water level measurements and sampling for pollutants.	For at least one year following commencement of operation of RA-1
g.	Submit all analytical results and a report acceptable to the Executive Officer on the effectiveness of	One year after the commencement of operation of

	distribution of pollutants. The report shall address, if necessary, the need for additional interim remedial measures.	
h.	Submit a report which evaluates interim cleanup alternatives for the North Bayshore area and which contains a recommended plan for the Executive Officer's consideration.	July 15, 1986
i.	Complete construction and implement an interim cleanup plan for the North Bayshore area acceptable to the Executive Officer.	January 15, 1987
j.	Prepare a proposed draft remedial action plan based upon Section 25350, Subpart F of the National Oil and Hazardous Substances Pollution Contingency Plan (40 C.F.R. Sec. 300.61 et seq.) and upon Section 25356.1(c) of the Health and Safety Code.	Within one year of complying with Provision 4.i.

6. The discharger shall submit to the Board quarterly reports summarizing its progress toward compliance with the Provisions specified in this Order, including specific actions taken and actions proposed prior to the next report. These quarterly reports will also contain any information specified in a self - monitoring program approved by the Executive Officer. Reports will be submitted within 45 days of the end of each calendar quarter with the first report due by May 15, 1986.

7. All necessary final remedial actions in the Terra Bella Avenue and North Bayshore areas shall be addressed under applicable law.

8. All samples shall be analyzed by State certified laboratories using approved EPA methods for the type of analysis to be performed. All laboratories shall maintain quality assurance/quality control records for Board review.

9. The discharger shall permit the Board or its authorized representative, in accordance with Section 13267(c) of the California Water Code:

   a. Entry upon premises in which any pollution sources exist, or may potentially exist, or in which any required records are kept.

   b. Access to copy any records required to be kept under terms and conditions of this Order.

   c. Inspection of any monitoring equipment or methods required by

this Order.

d. Sampling of any groundwater or soil which is accessible, or may become accessible as part of any investigation or cleanup program, to the discharger.

10. The discharger shall maintain in good working order and operate, as efficiently as possible, any facility or control system installed to achieve compliance with the requirements of this Order.

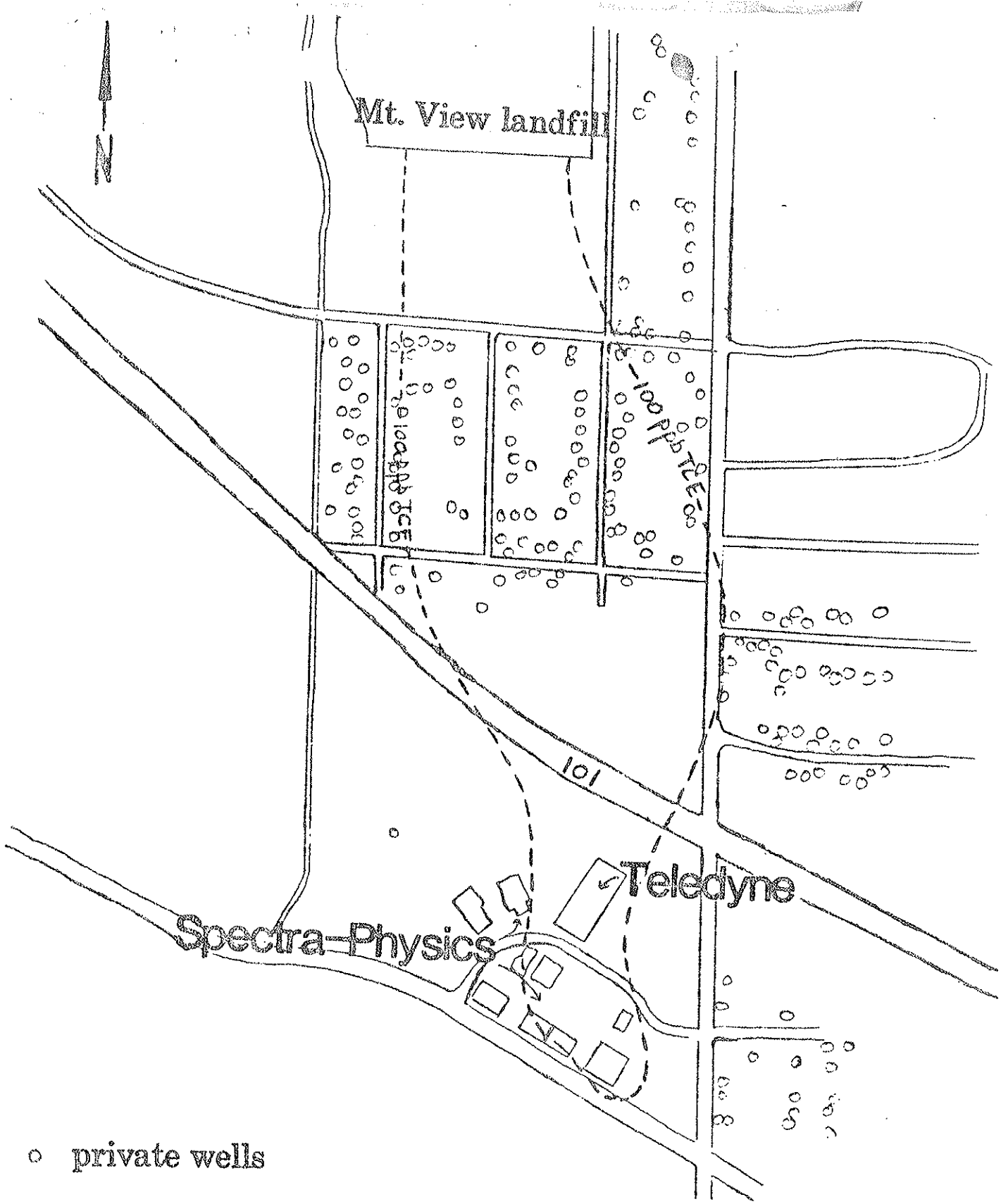
11. Copies of all correspondence, work plans and technical reports pertaining to the interim remedial investigation and remedy selection shall be supplied to EPA.

12. The Board will review this Order periodically and may revise the requirements when necessary.

I, Roger James, Executive Officer, do hereby certify the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on February 19, 1986.

ROGER B. JAMES
Executive Officer

Attachment: Site Map



SITE MAP

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